



**[4910-13-P]**

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 39**

**[Docket No. FAA-2008-0442; Directorate Identifier 2007-SW-24-AD;**

**Amendment 39-18291; AD 2015-20-12]**

**RIN 2120-AA64**

**Airworthiness Directives; Various Sikorsky-Manufactured Transport and  
Restricted Category Helicopters**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Final rule.

**SUMMARY:** We are superseding Airworthiness Directive (AD) 98-26-02 for certain Sikorsky Aircraft Corporation (Sikorsky) Model S-61A, D, E, L, N, NM, R, and V helicopters. AD 98-26-02 required determining whether the main rotor shaft (MRS) was used in repetitive external lift (REL) operations, performing a nondestructive inspection (NDI) for cracks, replacing any unairworthy MRS, and establishing retirement lives for each REL MRS. This new AD retains some of the requirements of AD 98-26-02 but determines a new retirement life for each MRS, expands the applicability to include additional helicopters, and requires removing from service any MRS with oversized dowel pin bores. This AD was prompted by the manufacturer's reevaluation of the retirement life for the MRS based on torque, ground-air-ground (GAG) cycle, and fatigue

testing. We are issuing this AD to prevent MRS structural failure, loss of power to the main rotor, and subsequent loss of control of the helicopter.

**DATES:** This AD is effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The Director of the Federal Register approved the incorporation by reference of a certain publication listed in this AD as of [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** For service information identified in this AD, contact Sikorsky Aircraft Corporation, Attn: Manager, Commercial Technical Support, mailstop s581a, 6900 Main Street, Stratford, Connecticut, telephone (203) 383-4866, email [tsslibrary@sikorsky.com](mailto:tsslibrary@sikorsky.com), or at <http://www.sikorsky.com>. You may view this referenced service information at the FAA, Office of the Regional Counsel, 10101 Hillwood Pkwy, Room 6N-321, Fort Worth, TX 76177.

#### **Examining the AD Docket**

You may examine the AD docket on the Internet at <http://www.regulations.gov> in Docket No. FAA-2008-0442; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this AD, any incorporated-by-reference information, the economic evaluation, any comments received, and other information. The address for the Docket Office (phone: 800-647-5527) is Document Management Facility, U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.

**FOR FURTHER INFORMATION CONTACT:** Tracy Murphy, Aviation Safety Engineer, Boston Aircraft Certification Office, Engine & Propeller Directorate, FAA, 12 New England Executive Park, Burlington, Massachusetts 01803; telephone (781) 238-7172; email [tracy.murphy@faa.gov](mailto:tracy.murphy@faa.gov).

**SUPPLEMENTARY INFORMATION:**

**Discussion**

On April 10, 2008, we issued a notice of proposed rulemaking (NPRM) (73 FR 21556, April 22, 2008) proposing to amend 14 CFR part 39 by adding an AD for Sikorsky Aircraft Corporation Model S-61A, D, E, L, N, NM, R, and V; Croman Corporation Model SH-3H; Carson Helicopters, Inc., Model S-61L; Glacier Helicopters, Inc., Model CH-3E; Robinson Air Crane, Inc., Model CH-3E, CH-3C, HH-3C and HH-3E; and Siller Helicopters Model CH-3E and SH-3A helicopters. The NPRM proposed superseding AD 98-26-02 (63 FR 69177, December 16, 1998), which required determining whether the MRS was used in REL operations, performing an NDI for cracks, replacing any unairworthy MRS, and establishing retirement lives for each REL MRS. The NPRM proposed to retain some of the requirements of AD 98-26-02 but also proposed a new retirement life determination for each MRS, removing from service any MRS with oversized dowel pin bores, and expanding the applicability to include certain restricted category models. The NPRM was prompted by the manufacturer's reevaluation of the retirement life for the MRS based on torque, GAG cycle, and fatigue testing. Those proposals were intended to prevent MRS structural failure, loss of power to the main rotor, and subsequent loss of control of the helicopter.

On April 16, 2013, we issued a supplemental NPRM (SNPRM) (78 FR 24363, April 25, 2013) that proposed to revise the NPRM based on comments received on the NPRM and a reevaluation of the relevant data. The SNPRM proposed retaining the proposals in the NPRM but extending the hours TIS required for identifying the MRS as an REL MRS to coincide with the NDI to prevent repeated disassembly of the shaft. The SNPRM also proposed to extend the time required to replace the MRS and revise calculations for establishing the retirement life.

On September 19, 2014, we issued a second SNPRM (79 FR 60789, October 8, 2014). In addition to retaining previously-proposed requirements, the second SNPRM revised the Cost of Compliance section to reflect an increased cost for parts to replace an MRS and clarified some of the wording for complying with the AD.

Since the SNPRM (79 FR 60789, October 8, 2014) was issued, the FAA Southwest Regional Office has relocated. We have revised the physical address to reflect the new address.

### **Comments**

We gave the public the opportunity to participate in developing this AD, but we did not receive any comments on the second SNPRM (79 FR 60789, October 8, 2014).

### **FAA's Determination**

We have reviewed the relevant information and determined that an unsafe condition exists and is likely to exist or develop on other helicopters of these same type designs and that air safety and the public interest require adopting the AD requirements as proposed except for a minor change. Sikorsky Aircraft was inadvertently omitted as one of the current type certificate holders of some of the applicable model helicopters; we

are correcting that error in this AD. This change is consistent with the intent of the proposals in the SNPRM (79 FR 60789, October 8, 2014) and will not increase the economic burden on any operator nor increase the scope of the AD.

#### **Related Service Information under 1 CFR part 51**

Sikorsky issued Alert Service Bulletin No. 61B35-69, dated April 19, 2004, which provides procedures for determining REL and Non-REL status, assigns new REL and Non-REL MRS retirement lives, and provides a method for marking the REL MRS. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in the ADDRESSES section of this AD.

#### **Other Related Service Information**

Sikorsky issued Customer Service Notice (CSN) No. 6135-10, dated March 18, 1987, and Service Bulletin (SB) No. 61B35-53, dated December 2, 1981, both revised with Revision A on April 19, 2004, for Model S-61L, N, and NM (serial number (S/N) 61454), and R series transport category helicopters; and S-61A, D, E, and V series restricted category helicopters. CSN 6135-10A specifies replacing the planetary assembly and MRS assembly attaching hardware with high strength hardware. CSN 6135-10A also specifies reworking the dowel retainer to increase hole chamfer and related countersink diameters. SB 61B35-53A specifies replacing the existing planetary matching plates with new steel matching plates during overhaul at the operator's discretion.

Sikorsky Aircraft Corporation also issued an All Operators Letter CCS-61-AOL-04-0005, dated May 18, 2004, which contains an example and additional information about tracking cycles and the moving average procedure.

### **Costs of Compliance**

We estimate that this AD affects 60 helicopters of U.S. Registry. We estimate that operators may incur the following costs in order to comply with this AD. It will take about 2.2 work-hours to NDI an REL MRS at \$85 per work-hour plus a \$50 consumable cost, for a total estimated cost of \$237 per helicopter and \$14,220 for the U.S. fleet. It will take about 2.2 work-hours to replace an MRS at \$85 per work-hour plus parts cost of \$81,216, for a total estimated cost of \$81,403 per helicopter.

### **Authority for this Rulemaking**

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, Section 106, describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

## **Regulatory Findings**

We have determined that this AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Is not a “significant rule” under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),

(3) Will not affect intrastate aviation in Alaska to the extent that a regulatory distinction is required, and

(4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

## **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

## **Adoption of the Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

## **PART 39 - AIRWORTHINESS DIRECTIVES**

- 1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

**§ 39.13 [Amended]**

2. The FAA amends § 39.13 by removing Airworthiness Directive (AD) 98-26-02, Amendment 39-10943 (63 FR 69177, December 16, 1998), and adding the following new AD:

**2015-20-12 Sikorsky Aircraft Corporation; Sikorsky Aircraft; Croman Corporation; Carson Helicopters, Inc.; Glacier Helicopters, Inc.; Robinson Air Crane, Inc.; and Siller Helicopters:** Amendment 39-18291; Docket No. FAA-2008-0442; Directorate Identifier 2007-SW-24-AD.



**(a) Applicability**

This AD applies to Model S-61A, D, E, L, N, NM (serial number (S/N) 61454), R, V, CH-3C, CH-3E, HH-3C, HH-3E, SH-3A, and SH-3H helicopters with main rotor shaft (MRS), part number S6135-20640-001, S6135-20640-002, or S6137-23040-001, installed, certificated in any category.

**(b) Unsafe Condition**

This AD defines the unsafe condition as MRS structural failure, loss of power to the main rotor, and subsequent loss of control of the helicopter.

**(c) Affected ADs**

This AD supersedes AD 98-26-02, Amendment 39-10943 (63 FR 69177, December 16, 1998).

**(d) Effective Date**

This AD becomes effective [INSERT DATE 35 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**(e) Compliance**

You are responsible for performing each action required by this AD within the specified compliance time unless it has already been accomplished prior to that time.

**(f) Required Actions**

(1) Within 10 hours time-in-service (TIS):

(i) Create a component history card or equivalent record for each MRS.

(ii) If there is no record of the hours TIS on an individual MRS, substitute the helicopter's hours TIS or the helicopter's transmission hours TIS if both the shaft and transmission were installed new at the same time.

(iii) If the record of external lift cycles (lift cycles) on an individual MRS is incomplete, add the known number of lift cycles to a number calculated by multiplying the number of hours TIS of the individual MRS by the average lift cycles calculated according to the instructions in Section I of Appendix 1 of this AD or by a factor of 13.6, whichever is higher. An external lift cycle is defined as a flight cycle in which an external load is picked up, the helicopter is repositioned (through flight or hover), and the helicopter hovers and releases the load and departs or lands and departs.

(iv) At the end of each day's operations, record the number of lift cycles performed and the hours TIS.

(2) Within 250 hours TIS, determine whether the MRS is a repetitive external lift (REL) or Non-REL MRS.

(i) Calculate the first moving average of lift cycles by following the instructions in Section I of Appendix 1 of this AD.

(A) If the calculation results in 6 or more lift cycles per hour TIS, the MRS is an REL-MRS.

(B) If the calculation results in less than 6 lift cycles per hour TIS, the MRS is a Non-REL MRS.

(ii) If the MRS is a Non-REL MRS based on the calculation performed in accordance with paragraph (f)(2)(i) of this AD, thereafter at intervals of 50 hour TIS, recalculate the average lift cycles per hour TIS by following the instructions in Section II of Appendix 1 of this AD.

(iii) Once an MRS is determined to be an REL MRS, you no longer need to perform the 250-hour TIS moving average calculation, but you must continue to count and record the lift cycles and number of hours TIS.

(iv) If an MRS is determined to be an REL MRS, it remains an REL MRS for the rest of its service life and is subject to the retirement times for an REL MRS.

(3) Within 1,100 hours TIS:

(i) Conduct a Non-Destructive Inspection for a crack on each MRS. If there is a crack in an MRS, before further flight, replace it with an airworthy MRS.

(ii) If an MRS is determined to be an REL MRS, identify it as an REL MRS by etching “REL” on the outside diameter of the MRS near the part S/N by following the Accomplishment Instructions, paragraph 3.C., of Sikorsky Alert Service Bulletin No. 61B35-69, dated April 19, 2004.

(4) Replace each MRS with an airworthy MRS on or before reaching the revised retirement life as follows:

(i) For an REL MRS that is not modified by following Sikorsky Customer Service Notice (CSN) No. 6135-10, dated March 18, 1987, and Sikorsky Service Bulletin (SB) No. 61B35-53, dated December 2, 1981 (unmodified REL MRS), the retirement life is 30,000 lift cycles or 1,500 hours TIS, whichever occurs first.

(ii) For an REL MRS that is modified by following Sikorsky CSN No. 6135-10, dated March 18, 1987, and Sikorsky SB No. 61B35-53 dated December 2, 1981; or Sikorsky CSN No. 6135-10A and Sikorsky SB No. 61B35-53A, both Revision A, and both dated April 19, 2004 (modified REL MRS), the retirement life is 30,000 lift cycles or 5,000 hours TIS, whichever occurs first.

(iii) For a Non-REL MRS, the retirement life is 13,000 hours TIS.

(5) Establish or revise the retirement lives of the MRS as indicated in paragraphs (f)(4)(i) through (f)(4)(iii) of this AD by recording the new or revised retirement life on the MRS component history card or equivalent record.

(6) Within 50 hours TIS, remove from service any MRS with oversized (0.8860” or greater diameter) dowel pin bores.

**(g) Alternative Methods of Compliance (AMOCs)**

(1) The Manager, Boston Aircraft Certification Office, FAA, may approve AMOCs for this AD. Send your proposal to: Tracy Murphy, Aviation Safety Engineer, Boston Aircraft Certification Office, Engine & Propeller Directorate, FAA, 12 New England Executive Park, Burlington, Massachusetts 01803; telephone (781) 238-7172; email [tracy.murphy@faa.gov](mailto:tracy.murphy@faa.gov).

(2) For operations conducted under a 14 CFR part 119 operating certificate or under 14 CFR part 91, subpart K, we suggest that you notify your principal inspector, or lacking a principal inspector, the manager of the local flight standards district office or certificate holding district office, before operating any aircraft complying with this AD through an AMOC.

**(h) Additional Information**

Sikorsky Aircraft Corporation All Operators Letter CCS-61-AOL-04-0005, dated May 18, 2004; Sikorsky Customer Service Notice (CSN) No. 6135-10, dated March 18, 1987; Sikorsky CSN No. 6135-10A, Revision A, dated April 19, 2004; Sikorsky Service Bulletin (SB) No. 61B35-53, dated December 2, 1981; and Sikorsky SB No. 61B35-53A, Revision A, dated April 19, 2004, which are not incorporated by reference, contain

additional information about the subject of this AD. For more information about these documents, contact Sikorsky Aircraft Corporation, Attn: Manager, Commercial Technical Support, mailstop s581a, 6900 Main Street, Stratford, Connecticut, telephone (203) 383-4866, email [tsslibrary@sikorsky.com](mailto:tsslibrary@sikorsky.com), or at <http://www.sikorsky.com>. You may review a copy of the referenced service information at the FAA, Office of the Regional Counsel, 10101 Hillwood Pkwy, Room 6N-321, Fort Worth, TX 76177.

**(i) Subject**

Joint Aircraft Service Component (JASC) Code: 6320, Main Rotor Gearbox.

**(j) Material Incorporated by Reference**

(1) The Director of the Federal Register approved the incorporation by reference of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) Sikorsky Alert Service Bulletin No. 61B35-69, dated April 19, 2004.

(ii) Reserved.

(3) For Sikorsky service information identified in this AD, contact Sikorsky Aircraft Corporation, Attn: Manager, Commercial Technical Support, mailstop s581a, 6900 Main Street, Stratford, Connecticut, telephone (203) 383-4866, email [tsslibrary@sikorsky.com](mailto:tsslibrary@sikorsky.com), or at <http://www.sikorsky.com>.

(4) You may view this service information at FAA, Office of the Regional Counsel, Southwest Region, 10101 Hillwood Pkwy, Room 6N-321, Fort Worth, TX

76177. For information on the availability of this material at the FAA, call (817) 222-5110.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call (202) 741-6030, or go to:  
<http://www.archives.gov/federal-register/cfr/ibr-locations.html>.

## **Appendix 1 to AD 2015-20-12**

### **Section I: The first moving average of external lift cycles (lift cycles) per hour time-in-service (TIS)**

The first moving average calculation is performed on the main rotor shaft (MRS) assembly when the external lift component history card record reflects that the MRS assembly has reached its first 250 hours TIS. To perform the calculation, divide the total number of lift cycles performed during the first 250 hours TIS by 250. The result will be the first moving average calculation of lift cycles per hour TIS.

### **Section II: Subsequent moving average of lift cycles per hour TIS**

Subsequent moving average calculations are performed on the MRS assembly at intervals of 50 hour TIS after the first moving average calculation. Subtract the total number of lift cycles performed during the first 50-hour TIS interval used in the previous moving average calculation from the total number of lift cycles performed on the MRS assembly during the previous 300 hours TIS. Divide this result by 250. The result will be the next or subsequent moving average calculation of lift cycles per hour TIS.

### **Section III: Sample calculation for subsequent 50 hour TIS intervals**

Assume the total number of lift cycles for the first 50 hour TIS interval used in the previous moving average calculation = 450 lift cycles and the total number of lift cycles for the previous 300 hours TIS = 2700 lift cycles. The subsequent moving average of lift cycles per hour TIS =  $(2700 - 450)$  divided by 250 = 9 lift cycles per hour TIS.

Issued in Fort Worth, Texas, on October 4, 2015.

Lance T. Gant,

Manager, Rotorcraft Directorate,  
Aircraft Certification Service.

